Milner.—No one killed; property damage, $10,000.

In every case the property damage corresponds to newspaper estimates, and in my opinion, are all ten times too large.

The storm which struck West Point at about 3:30 p. m., and La Grange half an hour later, was probably a tornado, but the disturbances reported at other widely separated places, Macon, Washington, and Milner were only severe squalls. Even at Atlanta, which experienced no storm, the day was remarkably dark. The newspapers contained the usual accounts of the damage wrought by the storm and the distressing features connected with it. Thirty-four people were killed, mostly in the cotton mill settlement at La Grange, and a considerable number were injured but nearly all only slightly. The pontoon bridge at West Point was swept away, but the Chattahoochie River did not quite reach the flood stage, and the assurance, given by this office, that the river would not exceed the flood stage of 20 feet was of some value.—*C. F. von Herrmann, Atlanta.*

Macon.—The forenoon was sultry, but with moderate breeze from south and southwest, shifting to southeast at 3:05 p. m. During the afternoon the sky looked ominous to the north and northwest and muttering thunder was first heard at 4:45 p. m. The storm was apparently moving slowly from the southwest to the northeast. At 6:35 p. m. a gentle rain began, that gradually increased in intensity about 6:47 p. m., the wind shifting to the northwest. At 6:50 it was blowing hard from the northwest, and then suddenly the storm burst in all its fury, accompanied by heavy hail from about 6:50 to 7 p. m. The wind increased in force, and a maximum velocity of 59 miles from the northwest was recorded with an extreme velocity of 78 miles. The storm was very severe for about 10 minutes with deafening crashes of thunder, mingled with the pelting of hailstones and the howling of the wind, the velocity exceeding anything previously experienced at this station in 21 years. The darkness was intense and nothing could be seen except during the flashes of lightning. The roof of the instrument shelter was carried away and hurled about 50 feet, almost demolishing one of the large ventilators on the roof. The instruments, strange to say, were uninjured and this is rather remarkable since the sunshine recorder was fastened to the shelter immediately below the roof. The temperature did not fall as much as might have been expected, and only reached 61° from 79°. The rain gradually moderated and the temperature rose rather rapidly, reaching about 72° at midnight. The pressure rose about 0.14 inch and then receded about 0.06 inch. Hardly a house in Macon escaped damage of some kind, and the loss is estimated at about $500,000. A colored woman is reported killed by lightning.

The hail partially melted as it fell, and by 8 p. m. none was seen on the ground or roof.—*R. M. Geddings, Macon.*

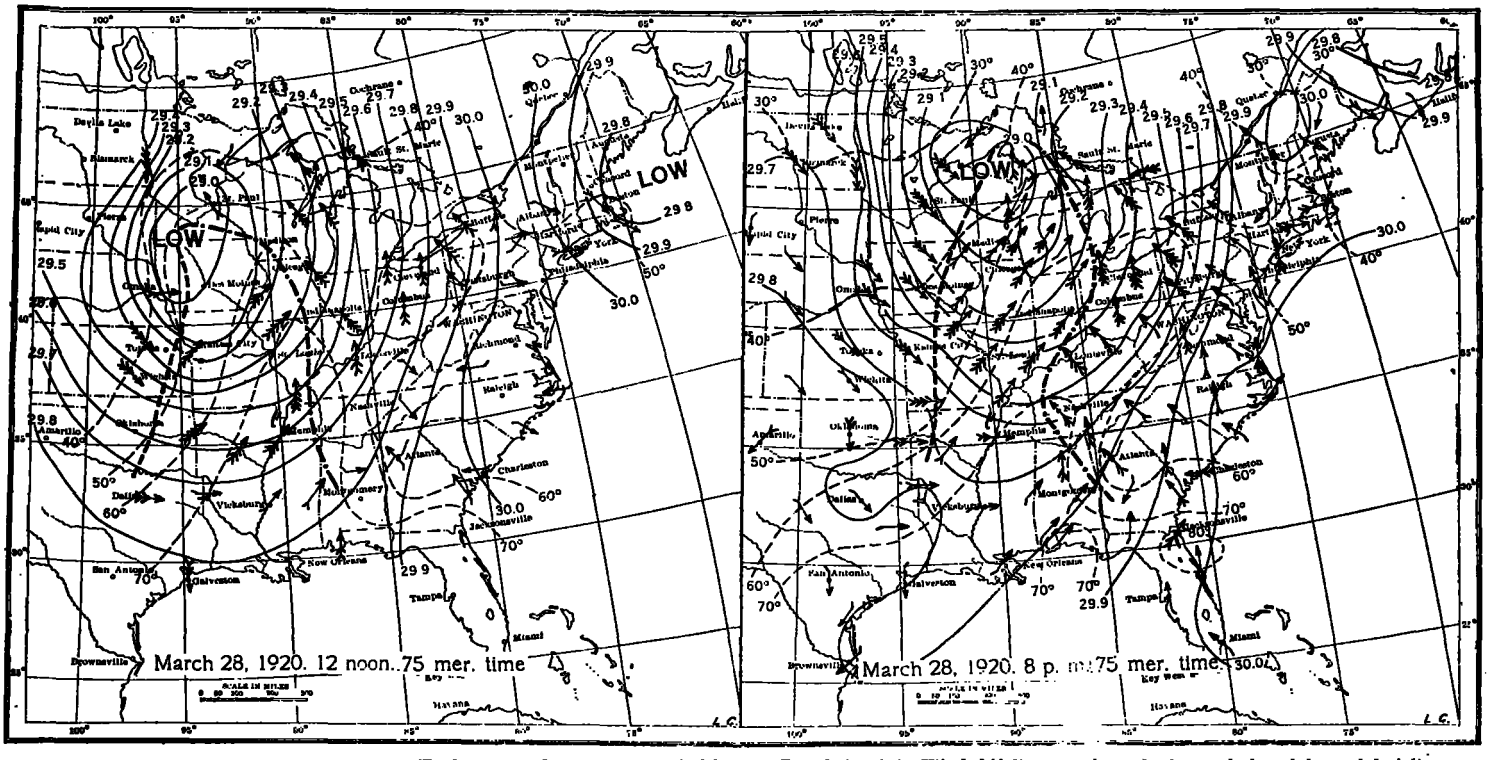
CONCLUSION.

Why did these 13 tornadoes occur on the afternoon of March 28? Let us review the facts as brought out by the weather observations:

1. There were strong, unusually warm winds from the southeast and south-southeast over a large area from the Gulf of Mexico to the Great Lakes.

2. A well-marked line (see dot-and-dash lines, figs. 8 and 9) separated these winds from still stronger, but slightly cooler, southwest or south-southwest winds in a belt immediately to the west.

3. Heavy thunderstorms, some with tornadoes and hail, occurred along this line of converging winds.



FIGS. 8-9.—Weather maps, March 28, 1920. (Barbs on wind arrows show wind force in Beaufort scale.) Wind-shift lines are shown by heavy dash and dot and dash line.

4. Immediately to the west of the northern portion of this line was a belt of diverging winds, characterized by brilliantly clear skies and exceedingly dry air, the driest on record at some stations. (Note surface wind-arrows on fig. 7.)

5. Kite observations indicated the presence of cold southwest-west wind at a moderate height overrunning the warm surface wind.

6. The northeastward movement of the tornadoes and lower clouds and the fall of hail on or to the east of tornado paths indicated a southwest to, at least, west-southwest wind not far aloft.

Surely this was an unusual set of conditions. With winds meeting at an angle of about 60° and at a rate of about 30 miles an hour, large volumes of air were sent upward and given a counterclockwise rotary motion by the thrusts of the southwest squalls routing under the rear portions of the slower north-northwestward-moving masses of warmer air. At a moderate height condensation took place in the moist, upthrust air, and as it ascended at a lesser rate of cooling, due to the liberation of latent heat of condensation, it probably was squeezed aloft at an increased rate by the cold wind it was probably encountering. Under such conditions intense vertical movement accompanied by a rotary motion of small dimensions makes a tornado.—*Charles F. Brooks.*

THE FOUR TORNADOES OF APRIL 20, 1920.

INTRODUCTORY NOTE.

The tornadoes of April 20, which were even more destructive than those of March 28, were apparently the result of a cold northerly wind overrunning the southerly surface wind. There was apparently no line of wind convergence, as in the case of March 28; but the striking feature is the formation, at approximately 60-mile intervals in a north-south line, of four tornadoes which swept along parallel paths from Mississippi into Alabama and Tennessee. The regular formation of these storms probably indicates the successive stages of the advancing cold air aloft: and the location of this front could be roughly determined by a line drawn through the synchronous positions of the tornadoes. According to newspaper accounts, which seem reliable, "loss of life * * * in Mississippi, Alabama, and Tennessee stood to-day [April 24] at 229 persons, with at least 700 injured, and a property loss of several million dollars."—EDITOR.

TORNADOES IN EASTERN MISSISSIPPI, APRIL 20, 1920.

By J. H. JAQUA, Observer.

[Meridian, Miss., May 21, 1920.]

Eastern Mississippi was visited on April 20, 1920, by the most destructive tornadoes of record in the area involved. A total of 130 persons were killed, 659 injured, and approximately 1,000 were rendered homeless. Incomplete statistics show that the property loss, exclusive of damage to crops, will approximate $1,500,000, which does not include damage done to standing timber.

METEOROLOGICAL CONDITIONS.

The morning weather map for April 20 shows the presence of an oval-shaped cyclone over the lower Mississippi Valley States (see fig. 1), the disturbance having made little eastward progress in 24 hours, but having materially changed its general shape. The pressure gradient over eastern Mississippi was about 0.1 inch to 75 miles. The barograph trace at Meridian shows that a slow fall in pressure had been in progress between midnight and 7 a. m. (See fig. 2 on plate facing p. 192.)

Temperatures ranged from 70° F. at Corinth to 75° F. at Meridian, or 10° F. in excess of the normal mean for the day. The northwest to southeast temperature gradient was probably not more than 5° F. in 120 miles. The trend of the isotherms was regular for the prevailing condition, and there was apparently a sharp wind-shift line, north and south through western Mississippi. (See fig. 1.)

The relative humidity was 86 per cent at 7 a. m., and had been practically stationary during the night, which was cloudy and sultry.

The conditions shown indicated the development of thunderstorms of convectional origin, and it was believed that the probability of the formation of tornadoes was not well decided. The most favorable feature that would warrant an assumption of the existence of incipient tornadic condition was the general atmospheric stress, which is frequently present under various arrangements of the isobars, but not as frequently productive of violent whirls. The rising humidity and abnormal surface temperatures prevailing in a season when the vertical temperature gradient is usually large indicated great

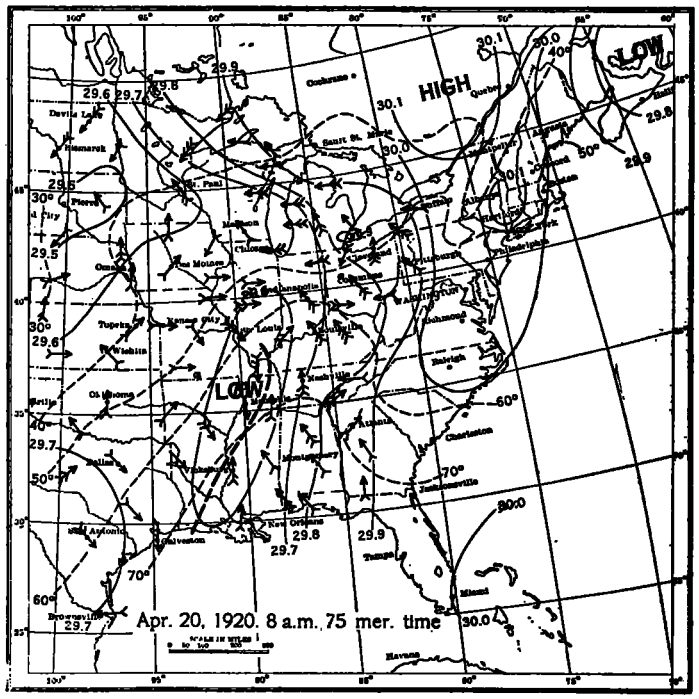


FIG. 1.—Weather map, April 20, 1920. (Barbs on wind arrows show wind force in Beaufort scale.) Wind-shift line heavy dashed.